

Comparison and Methods For Estimating Soil Surface Area

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Introduction

Soil surface area (SSA) is an important factor to consider when looking at agricultural and land management practices. Indirect methods of measuring SSA are typically done through clay content. For my research project I have compared two methods of measuring clay content and soil texture. One of them is through the Hydrometer method and the other is through the Laser Particle Size Analyzer (LPSA). I then took the clay content data and compared to BET SSA provided by another student researcher.

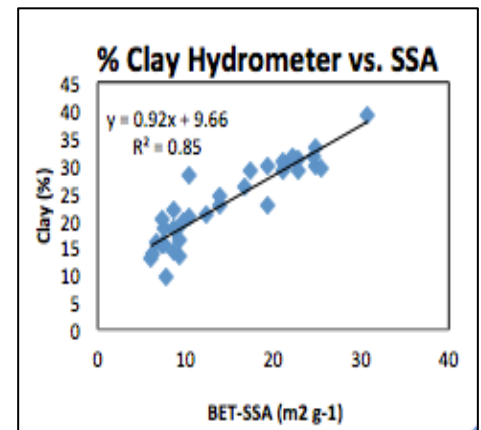
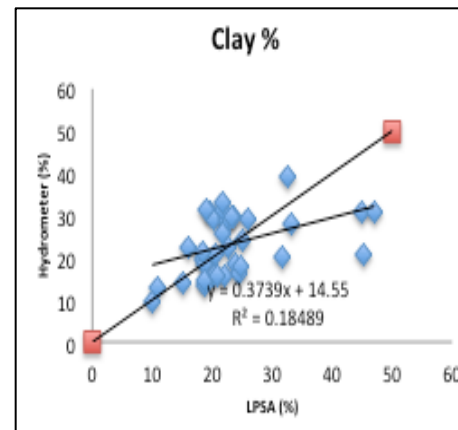
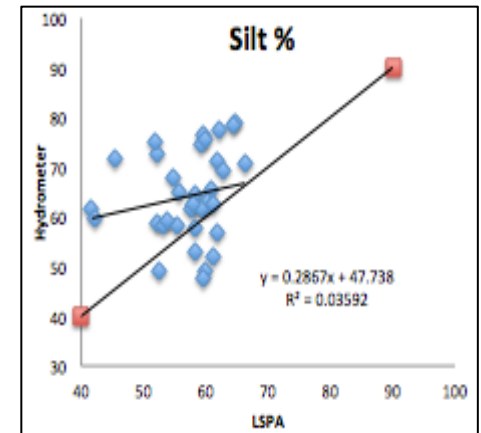
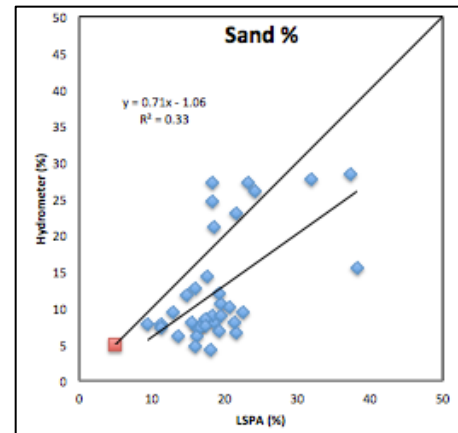
Methods

- I analyzed samples from Fillmore County in Minnesota that were given to me by my supervisor.
- There were six soil depths per each sample pit.
- The two main methods I used were the Hydrometer and LPSA.
- There has been extensive research on the Hydrometer method for soil texture analysis therefore making it more reliable. It takes a considerable amount of time to analyze a single sample pit.
- The LPSA method has not been researched as much and is thus not as reliable as the Hydrometer. It can analyze approximately four sites in the same amount of time it takes The Hydrometer method to analyze one.
- I already had data from the BET with the same soil samples. I used this data and compared it to the clay content to see if there was a correlation between the two.

Discussion

The LPSA cannot yet be used as a method to analyze soil texture, the data provided shows a poor correlation to the Hydrometer Method. I suspect that the LPSA wasn't calibrated accordingly and thus caused human errors that produced un-reliable results. The clay content correlates well with the SSA from the BET. This shows that clay content can be used to estimate SSA. The Hydrometer Method is considerably cheaper than using a BET making it useful for SSA predictions.

Results



This data shows that the LPSA method doesn't correlate well with the Hydrometer method. I used R-Squared values to observe the correlation between the methods given by each graph. According to the data the clay content (from the hydrometer) can be used to estimate soil surface area there is a strong correlation between the two.